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A constant rate effect without stable functions

Robert Truswell and Nikolas Gisborne

University of Edinburgh

`rob.truswell@ed.ac.uk`, `n.gisborne@ed.ac.uk`

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Micro-changes and macro-changes

- ▶ What counts as a change in a grammar?
- ▶ Small individual-level differences cumulatively engender large-scale syntactic reorganizations.
- ▶ That's because the small individual-level differences are not completely random.
- ▶ Kroch (1989): a class of changes can be construed as replacement of a form with a competing variant that does the same job.
- ▶ The gradual replacement takes place at the same rate across contexts.
- ▶ This is the Constant Rate Effect.
- ▶ Q1: what are the prerequisites for a CRE to emerge?
- ▶ Q2: what kind of tool is the CRE?

Uniformitarianism

- ▶ Uniformitarian hypothesis: ‘the view that the linguistic behavior of human beings in the past is broadly comparable with that used by our contemporaries’.
- ▶ Non-uniformitarian alternative (e.g. Heine & Kuteva 2007): ‘modern language was not always as complex as it is now’
- ▶ Major non-uniformitarian mechanism: grammaticalization.
 - ▶ Lexical → functional
 - ▶ Bleaching
- ▶ This works differently to Kroch’s classical CREs:

	Old	New
Kroch	function	form
Gramm.	form	function

- ▶ Claim: regardless, the underlying mechanism of competition is the same.

Roadmap

1. Background on grammar competition and the CRE.
2. Data: A Constant Rate Effect in the development of Middle English relative clauses.
3. Discussion: What does this tell us?

Section 1

Grammar competition and the Constant Rate Effect

S-curves are everywhere

- Grammar change very often looks like this:

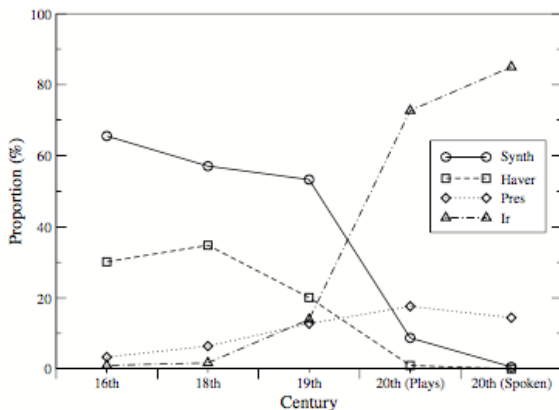


Figure 1 : Future markers in Brazilian Portuguese, from Poplack & Malvar (2007) via Blythe & Croft (2012)

S-curves are everywhere

- ▶ We've known this for a long time.

The process of change in the community would most probably be represented by an S-curve. The rate of change would probably be slow at first, appearing in the speech of innovators, or more likely young children; become relatively rapid as these young people become the agents of differential reinforcement; and taper off as fewer and fewer older and more marginal individuals remain to continue the old forms. (Osgood & Sebeok 1954: 155)

- ▶ See also Weinreich et al. (1968), Bailey (1973), Kroch (1989), Yang (2002), Niyogi (2006), Blythe & Croft (2012), ...

Deriving an S-curve

- ▶ The common understanding of the derivation of S-curves is already implicit in Osgood & Sebeok (1954). You need:
 - ▶ One (diachronically stable) function, F ,
 - ▶ Two competing Lexical Items realizing that function, LI_{Old} and LI_{New} .
- ▶ As more people use LI_{New} to do F , evidence that you should use LI_{New} to do F increases and evidence that you should use LI_{Old} to do F recedes.
- ▶ A simple equation can describe this shape:

$$\ln \frac{p}{1-p} = k + st \quad (1)$$

(where p is the frequency of one of the the two variants).

- ▶ Equivalently:

$$p = \frac{e^{k+st}}{1 + e^{k+st}} \quad (2)$$

- ▶ Two parameters:
 1. s describes the rate of change (higher = faster);
 2. k describes the intercept.

Varying s and k

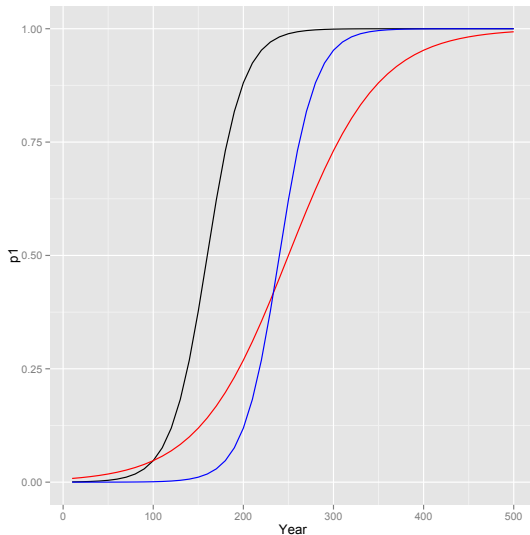


Figure 2 : Logistic functions with different slopes and intercepts

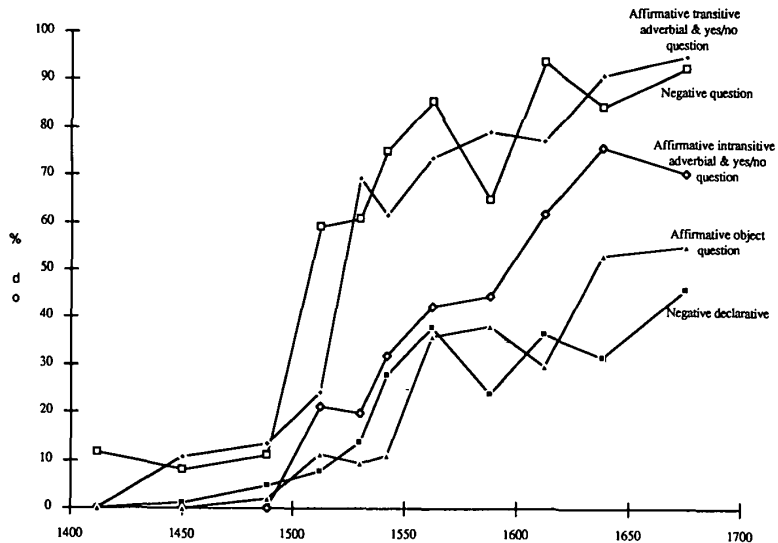
Kroch and Yang (and Borer) on interpreting S-curves

- ▶ S-curves reflect competition between pieces of grammars (Kroch 1989, 1994).
- ▶ Grammars are just bundles of lexical items and some invariant ways of combining them (Borer 1983, Kroch 1994).
- ▶ So S-curves reflect competition between lexical items.
- ▶ Speakers have a weighted distribution of such lexical items. The weights reflect correspondences between observed linguistic data and the generative capacity of different grammars (Yang 2002).
- ▶ s reflects the extent to which evidence favours the incoming grammar (Yang).
- ▶ k reflects the effect of contextual factors (as in classical sociolinguistic variable rule analysis).
- ▶ Constant Rate Effects arise if contextual factors are purely additive like this.

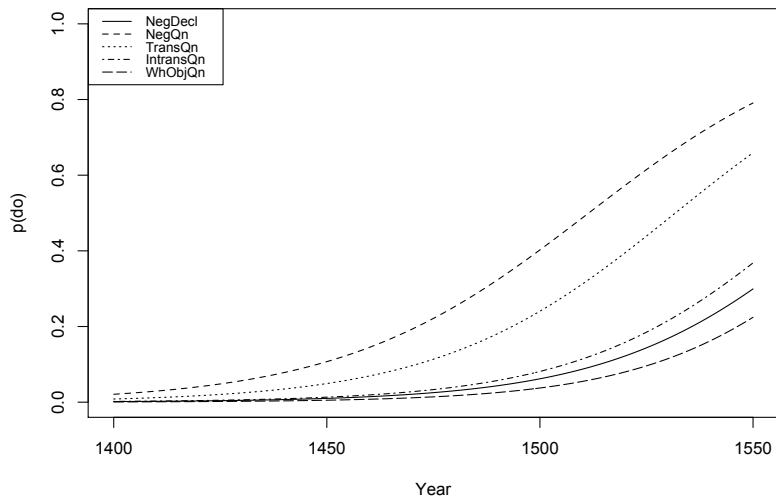
The emergence of *do*-support

- (1) Madame, sithyn ye know in sertayne, wherefore **do ye aske** hit me?
'Madam, since you now for certain, why do you ask me?'
(cmmalory,636.3829, c.1469)
- (2) How **gate ye** this swerd?
'How did you get this sword?' (cmmalory,9.242)
- (3) And so, he that vsed to teache, **did not** commonlie **vse** to beate
'And so, he that used to teach did not commonlie use to beat.'
(asch-e1-p2,12R.32, 1563–8)
- (4) bodelie labors, wrought by compulsion, **hurt not** the bodie
'Bodily labours, wrought by compulsion, do not hurt the body.'
(asch-e1-p1,9V.171)

Kroch's *do*-support CRE



Kroch's *do*-support CRE



Recap: Kroch's CREs

- ▶ A fixed function.
- ▶ Multiple competing lexical items realizing that function.
- ▶ Some factor globally favouring one of the competing realizations.
- ▶ Other factors locally favouring one of the competing realizations in particular contexts.
- ▶ No interactions between the two classes of factor.

Section 2

English *wh*-relatives

A partial typology of relative clauses

- ▶ A free relative is a clause with the external distribution of an NP.
- ▶ A headed relative is a clause that modifies a noun.
- ▶ Both are syntactically subordinate and typically interpreted within the scope of the matrix clause.
- ▶ A headed relative can be introduced by an inflecting phrase (a **relative specifier**), an uninflecting particle (a **relative complementizer**), both or neither.

- (5) a. The food

\emptyset	which
that	which that

 she ate
- b. What she ate

Wh-relatives: background

- ▶ Headed *wh*-relatives are largely confined to Indo-European.

	IE	Other
<i>Wh</i> -RC	19 (47.5%)	3 (2.3%)
Other	21 (52.5%)	129 (97.7%)

Table 1 : Headed *wh*-relatives in 172 languages (based on De Vries 2002)

- ▶ They appear to be absent from PIE and very early IE.
- ▶ So this is a recurring change across IE.
 - ▶ Visible in the written record of Romance, Germanic (several times over), Slavic, ...
- ▶ The change involved new uses of PIE lexical stock (**k^wi-*, *k^wo-*).
- ▶ The *wh*-forms occupied a grammatical function that could also be populated by demonstratives.
- ▶ English saw a loss of demonstrative relative specifiers (c.1150) followed by an emergence of *wh*-relatives.

Emergence of *wh*-relatives in Middle English

- ▶ First examples (c.1150) mainly have PP gaps.
- ▶ NP gaps emerged c.200 years later.
- ▶ Subject and object gaps appear at the same time.
- ▶ Once a *wh*-form becomes associated with relativization, it can be used across its full range of application.
- ▶ Initially an alternative PP relativization strategy (P-stranding) that largely died c.1200.
- ▶ Stable high-frequency alternative NP relativization strategy (*that*) throughout the period.

Early Middle English relatives

- (6) Ðis is sunfulla monna leddre [**þurh hwam** ure drihtan teh
This is sinful man's ladder through which our Lord draws
to him al moncun].
to him all mankind
"This is the sinful man's ladder, through which our Lord draws all
mankind to him." (cmlambx1-mx1,129.1279, c.1200)
- (7) Ðes wrecche **þe** he **of** spec wes ure feder adam
This wretch that he of spoke was our father Adam
"This wretch that he spoke of was our father Adam"
(cmlambx1-mx1,129.1287)
- (8) A yong man called Melibeus, myghty and riche, bigat upon his
wyf, **that** called was Prudence, a doghter **which that** called was
Sophie.
"A young man called Melibeus, mighty and rich, begat by his
wife, who was called Prudence, a daughter who was called
Sophie." (cmctmeli-m3,217.C1b.5, c.1390)

Specifying the change

- ▶ Largely old forms
- ▶ Not all old functions:
 - ▶ NP-relativization: old function (*that*-relatives);
 - ▶ PP-relativization: new (or renewed) function.
- ▶ New associations (of *which* with relativization):
 - ▶ *Which*-NP relativization: competes with *that*-relativization.
 - ▶ *Which*-PP relativization: doesn't directly compete with anything after c.1200.
- ▶ The two types of relative emerge at the same rate (no interaction of relative type with year, $p = 0.95$), despite the fact that only one is competing with *that*.

A CRE among relative types

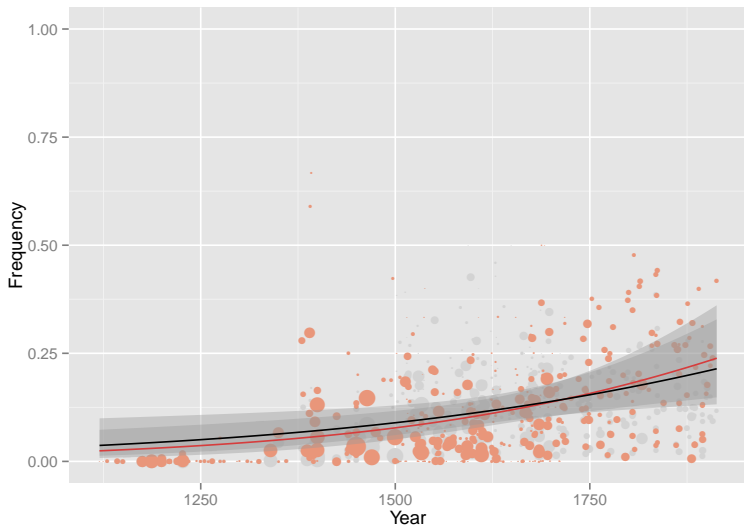


Figure 3 : The rise of headed *which*-RCs with argumental NP (black) and PP (red) gaps

Section 3

Discussion

Q1: what are the prerequisites for a CRE to emerge?

- ▶ Kroch's *do*-support CRE reflects the fact that English has always had ways to form negative declaratives, object *wh*-questions, etc., within a stable sentence grammar architecture.
- ▶ What changes is **how** you form those constructions.
- ▶ We don't have this functional stability: no way to form PP-gap relatives c.1200.
- ▶ But we do have stability of **forms**.
- ▶ This can create competition among potential uses of those forms:
 - ▶ What can you do with *which*? With *that*?
- ▶ So the major prerequisite is stability.
- ▶ But stability and competition can come in different guises.

Functional variability and Constant Rate Effects

- ▶ We speculate that competition with stable forms and unstable functions will not always generate CREs.
- ▶ As a form acquires new uses, its frequency of use will change.
- ▶ This may mean that we don't see the stability we need to see for a CRE to emerge.
- ▶ So why did we see one? Hypothesis: because the only other use of these forms in early ME (as interrogatives) was very low frequency.
- ▶ People who use *whereby* from c.1250 on almost always use it in headed relatives.

Q2: what kind of tool is the CRE?

- ▶ The CRE diagnoses gradual population-level transmission.
- ▶ Population-level transmission \rightsquigarrow not necessarily any reflex in individual grammars (though this is possible).
- ▶ Gradual transmission \rightsquigarrow some kind of competition at the population level.
 - ▶ Kroch: competition among forms realizing a given function.
 - ▶ Middle English: competition among functional specifications of a given form.
- ▶ In the history of IE, the $k^w i-/k^w o$ -**forms** are more stable than the functions they have been associated with.
- ▶ This second type of competition gives us a mechanism for moving beyond uniformitarianism.

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